**Lesson 01: Meaning of scientific Research**

**Introduction:**

Science assumes that we don’t know everything. Even more critically, it accepts that the things that we think we know could be proven wrong as we gain more knowledge. No concept, idea or theory is sacred and beyond challenge.[[1]](#footnote-2)

**1-Meaning of Research:**

Research is a diligent search, studious inquiry, investigation or experimentation aimed at the discovery of new facts and findings.

* + 1. Research involves the collection of information, interpretation of facts, and revision of existing theories or laws in the light of new facts or evidence.[[2]](#footnote-3)

**2-Definition of Research:**

There are many definitions of scientific research, including that it represents a systematic method that follows many successive steps, that start from problem knowledge and analysis, collecting and documenting data to derive a range of solutions arising from the analysis. Moreover, comparison and statistics. It is also a systematic and systematic investigation to validate facts, or establish new facts if scientific methods and methods are followed during scientific research, reporting and results. Others see that scientific research is a systematic study designed to meet the lack of knowledge, to compile and link things and concepts spread or mixed in understanding or application, or to achieve new scientific knowledge derived from the procedures and results of scientific research.[[3]](#footnote-4)

Research conducted for the purpose of contributing towards science by the systematic collection, interpretation and evaluation of data.[[4]](#footnote-5)

**3-Scientific Research Definition:**

Hunting for facts or truth about a subject?

Organized scientific investigation to :

* Solve problems.
* Test hypotheses.
* Develop or discover new products**.[[5]](#footnote-6)**
* A **scientific research definition** is that it is the process by which scientists study various phenomenon using systematic methods of collecting, analyzing, and interpreting data. It is often referred to as a creative process because it involves novel ways to test ideas that can lead to new ideas and information.

**4-What is scientific study?**

Scientific study is a method of obtaining information in order to address a previously identified problem or question. This often involves forming and testing a hypothesis, or an explanation for something based on prior knowledge or research. Scientists study a wide variety of topics, including medicine, psychology, chemistry, environmental sciences, and more. People can even conduct scientific research investigating aspects of their daily lives.

**5-What is the scientific method?**

The scientific method is the process of objectively establishing facts through testing and experimentation. The basic process involves making an observation, forming a hypothesis, making a prediction, conducting an experiment and finally [analyzing](https://www.techtarget.com/searchdatamanagement/definition/data-analytics) the results. The principals of the scientific method can be applied in many areas, including scientific research, business and technology.[[6]](#footnote-7)

**6-Objectives of scientific research:**

Scientific research aims to identify and build scientific knowledge that discovers and explains laws or principles of natural or social phenomena. There tend to be multiple explanations proposed by various researchers to explain a phenomenon. The aim of scientific research is to either provide supporting evidence or disprove them. [[7]](#footnote-8)

The objectives of scientific research vary according to its type and the nature of the result it will reach. The most important objectives of scientific research are:

* **- Access to new facts:**
* Using systematic thinking, analyzing phenomena and problems and seeking solutions to them, based on reliable facts, allows us to draw new facts and recommendations.
* **- Scientific Description:**
* The analysis of a phenomenon and trace its basis and refute its causes and analyze its symptoms to reach the exact scientific description of it, by completing the parts of scientific research and analysis of the problem or hypothesis and its components and their apparent and hidden implications and to reach an objective description, including guidance for optimal solutions.
* **- Forecasting the future:**
* It is a prediction based on scientific evidence, documented methodology and consecutive logical steps, all of which will ensure access to future knowledge as close to the truth with the right scientific research.
* **- Provide logical solutions to problems:**
* The subject of scientific research revolves around an intractable problem, the researcher resorted to refute it and solve it through scientific research and put forward hypotheses, observation, measurement, and others, but it is finally able to put forward a number of solutions supported by scientific evidence, and field experiments confirmed their feasibility and validity.
* **- Innovation and Renewal:**
* If you look at inventions and high-quality products, you will find that they are designed according to ideal standards resulting from a huge number of research and experiments, based on research on new facts, information and experiences will allow the researcher to reach new and innovative results based on the latest facts and research.[[8]](#footnote-9)

**7-What are the methods of research?**

There are many research methods ranging from a simple online survey to a high-budget clinical study. Here are some examples of popular data collection methods:

* Clinical trials
* Experiments
* Surveys
* Interviews
* Case studies (Investigates a contemporary phenomenon within its real-life context[[9]](#footnote-10), especially when the boundaries between phenomenon and context are not clearly evident[[10]](#footnote-11).Case studies focus on understanding the dynamics present within a single setting).[[11]](#footnote-12)
* Observations (Having admitted ignorance, science aims to obtain new knowledge. It does so by gathering observations and then using formal tools such as logic or mathematics to connect these observations into comprehensive theories).[[12]](#footnote-13)

Which one is right for your plan depends on your hypothesis, goals, industry regulations, and more.[[13]](#footnote-14)

1. Yuval Noah Harari: A BriefHistory of Humankind [↑](#footnote-ref-2)
2. Geng Cui : **Introduction to Research**, Faculty of Business, Lingnan University [↑](#footnote-ref-3)
3. hisham-hussein **: what-scientific-research-its-objectives** [↑](#footnote-ref-4)
4. [Ceyda Özhan Çaparlar](https://pubmed.ncbi.nlm.nih.gov/?term=%C3%87aparlar%20C%C3%96%5BAuthor%5D) and [Aslı Dönmez](https://pubmed.ncbi.nlm.nih.gov/?term=D%C3%B6nmez%20A%5BAuthor%5D) : What is Scientific Research and How Can it be Done? [Turk J Anaesthesiol Reanim.](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5019873/) 2016 Aug; 44(4): 212–218. [↑](#footnote-ref-5)
5. **Thomas Varghese: INTRODUCTION TO RESEARCH METHODOLOGY, Dept. of Physics**

   **Nirmala College, Muvattupuzha, 3 October 2023**  [↑](#footnote-ref-6)
6. https://www.techtarget.com/whatis/definition/scientific-method [↑](#footnote-ref-7)
7. https://www.hellovaia.com/explanations/psychology/research-methods-in-psychology/scientific-research/  
    [↑](#footnote-ref-8)
8. hisham-hussein **: what-scientific-research-its-objectives** ,op cité [↑](#footnote-ref-9)
9. Alexander Settles: **Case Study Research Method** , p04 [↑](#footnote-ref-10)
10. Yin, Robert "Ch 1: Designing Case Studies," **Case Study Research: Design & Methods**, 1994, 2nd edition, Thousand Oaks, CA: Sage Publications [↑](#footnote-ref-11)
11. Eisenhardt, Kathleen M., "Building Theories From Case Study Research," **Academy Of Management Review**, 198914(4) 532-550. [↑](#footnote-ref-12)
12. **Jan Recker: Scientific Research in Information Systems: A Beginner’s Guide (2nd edition)**, 2021, p 14 [↑](#footnote-ref-13)
13. https://monday.com/blog/project-management/why-is-the-research-plan-pivotal-to-a-research-project/

    [↑](#footnote-ref-14)